departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

What is claimed is:

1. An apparatus for processing a process region of a substrate: using a plasma, comprising:

a container substantially formed of a conductive material;

a partition plate dividing said container into an air-tight process chamber and an air-tight auxiliary chamber, and having a window plate made of dielectric;

a main pump exhaust for exhausting and setting said process chamber to a vacuum;

a work table arranged in said process chamber and having a support face facing said window plate, said substrate being mounted on said support face, with said process region facing said window plate;

a main supply for supplying a process gas between said window plate and said substrate mounted on said support face, at least part of said process gas being transformed into said plasma;

an induction electrode, for generating electromagnetic field between (1) said window plate and (2) said substrate mounted on said support face, to induce generation of said plasma, and including a coil arranged in said auxiliary chamber and facing said window plate;

a power supply section for applying a high frequency voltage to said coil;

an auxiliary exhaust pump for exhausting and setting said auxiliary chamber to a vacuum; and

a pressure controller connected to said auxiliary exhaust pump for keeping a pressure difference between pressures in said process and auxiliary chambers at a minimum value.

2. The apparatus according to claim 1, further comprising grounding means for grounding said container.

3. The apparatus according to claim 1, wherein said pressure controller is connected to said main exhaust pump.

4. The apparatus according to claim 1, further comprising a cooler for cooling said coil.

5. The apparatus according to claim 1, further comprising an auxiliary supply for supplying an inactive gas into said auxiliary chamber.

6. The apparatus according to claim 5, wherein said inactive gas supplied into said auxiliary chamber is a coolant, by which said coil is cooled.

7. The apparatus according to claim 6, wherein said auxiliary supply comprises a shower head arranged above said coil and having a plurality of gas supply holes facing said coil.

8. The apparatus according to claim 1, further comprising a seat arranged on said window plate and supporting said coil.

9. The apparatus according to claim 8, wherein a passage through which coolant is circulated is formed in said seat.

10. The apparatus according to claim 1, further comprising a lower electrode arranged in said work table and a power supply for applying a high frequency potential to said lower electrode.

11. The apparatus according to claim 10, wherein said apparatus is a plasma CVD apparatus to form a film on said process region of said substrate, said process gas is decomposed to provide a material of said film.

12. The apparatus according to claim 11, wherein said process gas comprises first and second gases, and said main supply comprises first and second supply members respec-

tively supplying said first and second gases, and wherein said second gas is transformed into said plasma while said first gas is excited and decomposed by said plasma.

13. The apparatus according to claim 12, wherein said first supply member includes a supply port arranged between said window plate and said support face, and said second supply member includes a supply port arranged between said window plate and said supply port of said first supply member.

14. The apparatus according to claim 13, wherein said first supply member comprises a first supply head arranged between said window plate and said support face and made of dielectric, and said supply port of said first supply member comprises a plurality of supply holes formed on said first supply member and arranged to uniformly cover

the whole of said process region of said substrate mounted on said support face.

15. The apparatus according to claim 14, wherein said first supply head comprises a lattice formed of a combination of pipe elements through which said first gas flows.

16. The apparatus according to claim 15, wherein said second supply member comprises a second supply head arranged between said window plate and said first supply head, made of dielectric, and comprising continuous frame formed of a combination of pipe elements through which said second gas flows, and said supply port of said second supply member comprises a plurality of supply holes formed on said second supply member.

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